# How to Buy a Water-Saving Replacement Toilet

**Energy Efficiency and Renewable Energy**
**Federal Energy Management Program**

## Why Agencies Should Buy Efficient Products

- *Executive Order 13123 and FAR section 23.704 direct agencies to purchase products in the upper 25% of energy efficiency, including all models that qualify for the EPA/DOE* ENERGY STAR® *product labeling program.*
- *Agencies that use these guidelines to buy efficient products can realize substantial operating cost savings and help prevent pollution.*
- *As the world's largest consumer, the federal government can help "pull" the entire U.S. market towards greater energy and water efficiency, while saving taxpayer dollars.*

## Federal Supply Source:

- Defense Logistics Agency (DLA)
  Phone: (800) DLA-2852 or (215) 737-8249
  DSN 444-8249 (Dan DiLossi)
  dscp103.dscp.dla.mil/gi/general/pgplum.htm

## For More Information:

- DOE's Federal Energy Management Program (FEMP) Help Desk and World Wide Web site have up-to-date information on energy-efficient federal procurement, including the latest versions of these recommendations.
  Phone: (800) 363-3732
  www.eren.doe.gov/femp/procurement
- American Water Works Association "WaterWiser" is a good resource for water conservation and efficiency information.
  Phone: (800) 559-9855
  www.waterwiser.org
- California Energy Commission (CEC) has a list of certified plumbing fixtures.
  Phone: (916) 654-5106
  ftp://energy.ca.gov/pub/efftech/appliance
- *Home Energy* magazine provides water conservation tips.
  Phone: (510) 524-5405
  www.homeenergy.org
- *Consumer Reports* rates plumbing fixtures.
  www.consumerreports.org
- Contact your local water utility for details about local water conservation programs and incentives.
- Lawrence Berkeley National Laboratory provided supporting analysis for this recommendation.
  Phone: (202) 646-7950

## Efficiency Recommendation

| Product Type | Recommended Flush Rate[a,b] | Best Available Flush Rate |
|---|---|---|
| Toilet | 1.6 gpf or less | 1.5 gpf |

a) Based on ASME test procedure A112.19.6-1990

b) The Recommended Flush Rate applies to "flushometer" (flush valve) as well as "gravity tank" toilets, and is measured in gallons per flush (gpf).

***Definition***

*The Recommended Flush Rate is exactly that required by the Energy Policy Act of 1992. This Recommendation is issued for the purpose of promoting early replacement.*

## Where to Find Water-Saving Replacement Toilets

The federal supply source for toilets is the Defense Logistics Agency (DLA). When buying from a commercial source (retailer or distributor), select or specify models with flush rates that meet the recommended level. All toilets manufactured for use in the U.S. after 1996 are required to meet this level.

## Buyer Tips

There is a wide range in flushing performance of new toilets. It is advisable to test various models under actual conditions before purchasing in volume.

## Installation and User Tips

For initial installation of a low-flush toilet, "snake" drain lines and replace the entire fixture. After a low-flush gravity tank unit is in operation, only the valve and ballcock need be replaced if the rest of the fixture still functions. With flush-valve toilets, make sure valves are properly adjusted. Leaky valves are a source of enormous water loss in both flush-valve and tank toilets, and are especially common in hard-water areas. These leaks are often invisible and inaudible. Semi-annual dye tablet testing is a simple and inexpensive way to detect leaks.

There are a variety of retrofit devices available to reduce the water flow of existing toilets. Some of these measures are effective and reliable while others can lead to plumbing problems. Consult your local water utility for appropriate water-saving options and rebate programs.

For specialized situations like prisons or hospitals, non-ceramic, metal toilets are available which have straight drain lines and have a flush rate of 0.5 gallons per flush (gpf). Replacing 3.5 gpf with 0.5 gpf toilets can lead to lifetime water savings even larger than those shown in the Cost-Effectiveness table, below.

Early replacement of a high flush-rate toilet can produce hundreds of dollars of water savings over the life of the new unit, as shown in the following table.

## Toilet Cost-Effectiveness Example A – Average Water Costs

| Performance | Typical Existing Unit | New Unit[a] | Best Available |
|---|---|---|---|
| Gallons per flush (gpf) | 3.5 gpf | 1.6 gpf | 1.5 gpf |
| Annual Water Use | 27,300 gallons | 12,500 gallons | 11,700 gallons |
| Annual Water Cost | $110 | $50 | $45 |
| 10-year Water Cost | $910 | $420 | $390 |
| Lifetime Water Cost Savings (for replacing existing unit 10 years early) | – | **$490** | **$520** |

a) The flush rate of the new unit just meets the current federal standards for toilets.

### Cost-Effectiveness Assumptions

Savings estimates are based on an existing flush rate of 3.5 gpf. Toilet use is assumed to be 30 flushes per day, and 260 days per year. The water price is assumed to be $4/1,000 gallons.

### Using the Cost-Effectiveness Table

In the example shown above, early replacement of the existing toilet with a new unit at the recommended flush rate of 1.6 gpf will save $490 in water costs over a 10-year period (the time before the old fixture would normally be replaced). Likewise, the Best Available model, with a flush rate of 1.5 gpf, will save $520 in water costs over a 10-year period. The example assumes that no water is lost through leakage.

### What if my Water Price is different?

To adjust the Lifetime Water Cost Savings in the table above for a different water price, multiply the figures listed by this ratio: $\left(\frac{\textit{Your price in \$/1000 gallons}}{\textit{\$4.00/1000 gallons}}\right)$. In many areas of the country, water costs dramatically exceed the average, deeming early toilet replacement particularly cost-effective. In the example below, water cost is assumed to be $10/1,000 gallons.

## Toilet Cost-Effectiveness Example B – High Water Costs

| Performance | Typical Existing Unit | New Unit[a] | Best Available |
|---|---|---|---|
| Gallons per flush (gpf) | 3.5 gpf | 1.6 gpf | 1.5 gpf |
| Annual Water Use | 27,300 gallons | 12,500 gallons | 11,700 gallons |
| Annual Water Cost | $270 | $125 | $120 |
| 10-year Water Cost | $2,300 | $1,050 | $1,000 |
| Lifetime Water Cost Savings (for replacing existing unit 10 years early) | – | **$1,250** | **$1,300** |

a) The flush rate of the new unit meets the current federal standards for toilets.

## Early Replacement

***Definition***

*The 10-year Water Cost is the sum of the discounted value of annual water costs, based on average usage and an assumption that early replacement of the toilet occurs at the midpoint of a 20-yr. useful life. A discount rate of 3.4% is based on federal guidelines (effective from April, 2000 to March, 2001). Future water and wastewater treatment costs are conservatively assumed to increase only at the rate of inflation.*

***Metric Conversion***

*1 gallon = 3.8 liters*

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